

12

EUROPEAN PATENT APPLICATION

21 Application number: 87201697.7

51 Int. Cl.4: **F16C 33/10**, H02K 5/167

22 Date of filing: 08.09.87

30 Priority: 16.09.86 NL 8602343

43 Date of publication of application:
23.03.88 Bulletin 88/12

64 Designated Contracting States:
DE ES FR GB IT NL SE

71 Applicant: **SKF Industrial Trading &
Development Co, B.V.**
Kelvinbaan 16
NL-3439 MT Nieuwegein(NL)

72 Inventor: **Lankamp, Herman, Dr.**
Van Zijldreef 18
Bunnik(NL)

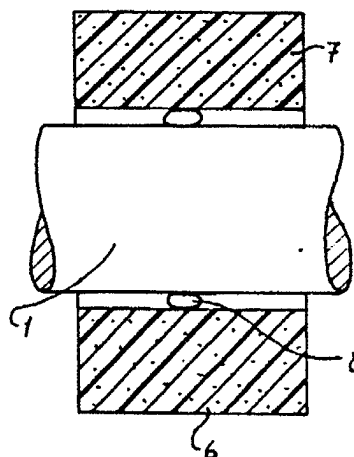
74 Representative: **Merkelbach, B.**
SKF Engineering & Research Centre B.V.
P.O. Box 2350
NL-3430 DT Nieuwegein(NL)

54 **Bearing assembly.**

57 According to known designs magnetic lubricant is used between the bearing-bushing and shaft, and kept therebetween by magnetic forces. The bushing, however, is a permanent magnet made of metal and moreover consists of several segments.

The claimed bearing arrangement is based upon a quite different viewpoint, namely to apply a plastic bushing (6) which contains magnetic particles (7). Between the shaft (1) and bushing (6) a small drop of a magnetic lubricant (8) is applied. Due to the magnetic properties of this arrangement a constant lubricant film is obtained. This arrangement is basically simple in design and cheap to manufacture, and particularly useful in electromotors for domestic appliances.

fig-2



EP 0 260 743 A1

Bearing assembly

The invention relates to a bearing assembly, in particular for an electric motor of a household appliance, comprising a bearing sleeve of a synthetic material forming the running surface of the bearing, a shaft mounted in said sleeve, and a lubricant between the running surface of the sleeve and the shaft, means being provided to retain said lubricant. Such a bearing assembly is generally known in the art.

Electric motors for household appliances should run as quiet as possible, which means among other things that the bearings must function optimally. An important condition for this is that the bearings must be well lubricated.

In the known bearing assembly, the running surface of the sleeve is provided with one or more grooves to retain the lubricant. It has been found, however, that environmental influences, such as comparatively high temperatures in the appliance, will cause the lubricant to drain along the shaft out of the grooves of the bearing, so that the sleeve and the electric motor suffer premature wear, resulting in an unacceptably high noise level or worse.

The object of the invention is to provide a bearing assembly of the type defined above which the lubricant will be retained essentially for an indefinite period, and at the same time to provide an economically advantageous bearing by virtue of its form and construction.

This object is accomplished in that, in the bearing assembly according to the invention, the bearing sleeve consists of a synthetic material in which particles of a magnetic material are imbedded, and the lubricant is a magnetic lubricant, of which so small a quantity is present between the shaft and the running surface of the sleeve that the lubricant forms an annular film of small axial breadth relative to the axial dimension of the sleeve.

In a bearing so constructed, the magnetic lubricant is very effectively retained by the magnetic flux created by the magnetic particles imbedded in the sleeve, the magnetic flux being prevented from escaping outside the sleeve because the force of attraction is greater towards the shaft than towards the surroundings of the sleeve. Furthermore, the bearing is less expensive than the known bearing, which requires an additional operation to produce the grooves.

Preferably the particles imbedded in the bearing sleeve consist of magnetite.

It is noted that a magnetic lubricant is known per se. It consists of a colloidal dispersion of extremely fine particles of a magnetic material in a liquid.

British Patent 2,058,953 discloses a bearing assembly employing a magnetic lubricant secured between the running surface of the bearing sleeve and the shaft lodged therein by a magnetic field set up by the sleeve. Here, however, the sleeve consists of a metal or alloy capable of being magnetized to become a permanent magnet. Besides, the bearing sleeve is composed of a plurality of segments each magnetized separately.

The invention will be illustrated in more detail with reference to the embodiment shown in the drawing by way of example, where

Fig. 1 shows an axial section of an electric motor of a household appliance with a bearing assembly according to the invention, and

Fig. 2 shows the bearing assembly drawn to a larger scale.

As shown in the drawing, the shaft 1 of the rotor of an electric motor 2 is mounted at one end by a ball bearing 3 and at the other end by a journal bearing 4 in a housing 5.

The journal bearing 4 comprises a bushing 6 of a synthetic material in which particles 7 of a magnetic material are imbedded. Between the shaft 1 and the bushing 6, a drop of magnetic lubricant 8 is introduced, which owing to the magnetic field set up by the magnetic particles 7 is formed into an annular film around the shaft 1. Note that in Fig. 2 the thickness of the lubricant film 8 has been much exaggerated.

Claims

1. Bearing assembly, in particular for an electric motor of a household appliance, comprising a bearing sleeve of a synthetic material forming the running surface of the bearing, a shaft mounted in said sleeve, and a lubricant between the running surface of the sleeve and the shaft, means being provided to retain the lubricant, characterized in that the bearing sleeve (6) consists of a synthetic material in which particles (7) of a magnetic material are imbedded, and the lubricant (8) is a magnetic lubricant of which so small a quantity is present between the shaft (1) and the running surface of the bearing sleeve that the lubricant forms an annular film (8) of a small axial breadth relative to the axial dimension of the sleeve.

2. Bearing assembly according to claim 1, characterized in that the particles (7) imbedded in the bearing sleeve consist of magnetite.

3. Bearing sleeve manifestly intended for use in the bearing assembly according to claim 1 or 2.

5

10

15

20

25

30

35

40

45

50

55

3

fig-1

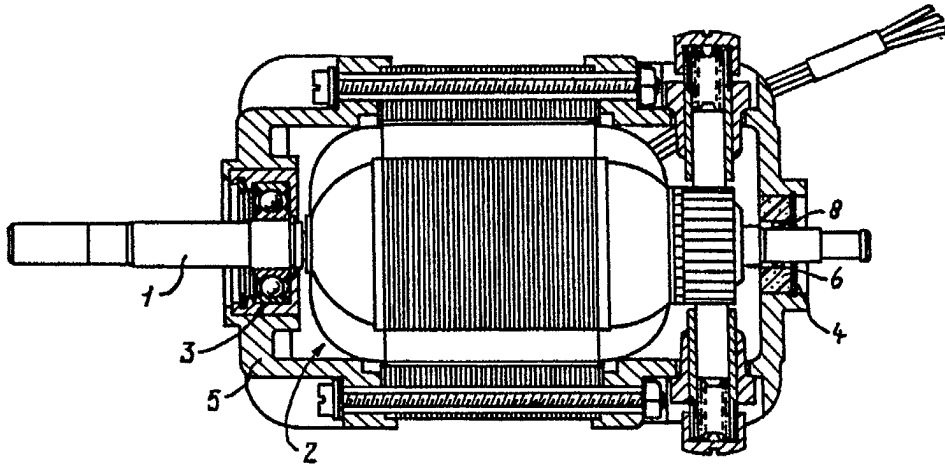
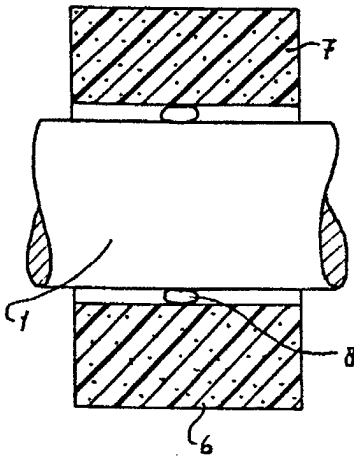


fig-2





Office européen
des brevets

RAPPORT DE RECHERCHE EUROPEENNE

Numero de la demande

EP 87 20 1697

| DOCUMENTS CONSIDERES COMME PERTINENTS | | | |
|---|---|---|--|
| Catégorie | Citation du document avec indication, en cas de besoin, des parties pertinentes | Revendication concernée | CLASSEMENT DE LA DEMANDE (Int. Cl.4) |
| Y | DE-A-3 304 623 (NIPPON SEIKO) * Page 1, ligne 1 - page 2, ligne 4; page 2, ligne 22 - page 4, ligne 21; page 13, lignes 3-34; page 15, ligne 11 - page 21, ligne 15; figures 4-12 * | 1-3 | F 16 C 33/10 H 02 K 5/167 |
| Y | PATENT ABSTRACTS OF JAPAN, vol. 8. no. 276 (M-346)[1713], 18 décembre 1984; & JP-A-59 147 117 (NIPPON SEIKO K.K.) 23-08-1984 * Résumé; figures 5,10 * | 1-3 | |
| D,A | GB-A-2 058 953 (LITTON SYSTEMS) * Page 2, ligne 99 - page 3, ligne 83 * | 1,3 | |
| A | US-A-4 043 616 (ZIMMER) * Colonne 3, lignes 3-21; figure 3 * | 1,3 | |
| | | | DOMAINES TECHNIQUES RECHERCHES (Int. Cl.4) |
| | | | F 16 C H 02 K |
| Le présent rapport a été établi pour toutes les revendications | | | |
| Lien de la recherche LA HAYE | | Date d'achèvement de la recherche 23-11-1987 | Examineur TIO K.H. |
| CATEGORIE DES DOCUMENTS CITES | | T : théorie ou principe à la base de l'invention E : document de brevet antérieur, mais publié à la date de dépôt ou après cette date D : cité dans la demande L : cité pour d'autres raisons & : membre de la même famille, document correspondant | |
| X : particulièrement pertinent à lui seul Y : particulièrement pertinent en combinaison avec un autre document de la même catégorie A : arrière-plan technologique O : divulgation non-écrite P : document intercalaire | | | |